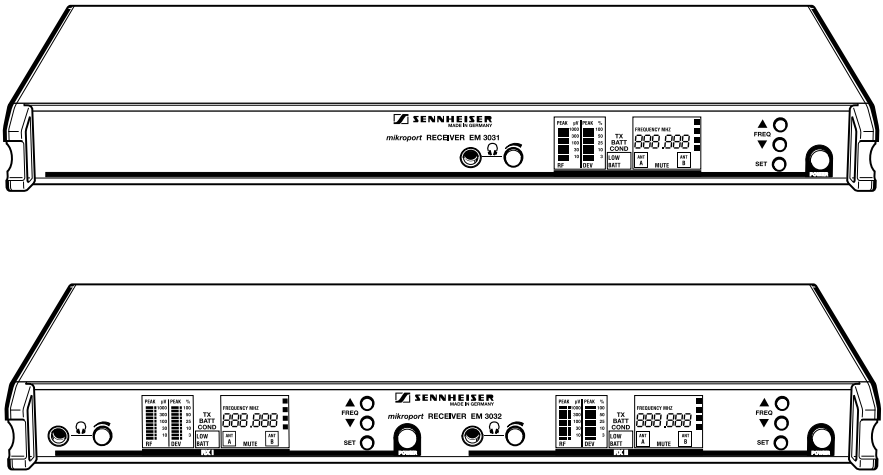
EM 3031-U
EM 3032-U

Instructions for use



Thank you for choosing Sennheiser!

You have made an excellent choice. This product will give you reliable and cost-effective ease of operation over many years. All of Sennheiser's professional expertise and more than fifty years of experience have gone into the creation of this state-of-the-art product.

Please take a few moments to read these instructions carefully. We want you to enjoy your new receiver quickly and to the full.

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1 Brief description

With the EM 3031-U and EM 3032-U receivers, Sennheiser offers the professional user high quality RF receivers with a high level of operational reliability and ease of use. The EM 3031-U and EM 3032-U receivers together with the suitable hand-held and pocket transmitters permit wireless transmission with studio quality sound. Due to further optimised PLL and microprocessor technology and the Sennheiser patented **HiDyn *plus*®** noise reduction system, these transmission systems surpass the signal-to-noise ratio and dynamic range of modern CD productions. The true diversity technology of the EM 3031-U and EM 3032-U receivers ensures interference-free transmission and minimises the drop-outs in the RF path.

Especially for small television studios and theatres, the simultaneous use of several EM 3031-U / EM 3032-U receivers is an economical alternative to technically more sophisticated and therefore more expensive multi-channel systems.

Variants

- EM 3031-U: Single-32-channel true diversitiy receiver
- EM 3032-U: Two-32-channel true diversitiy receiver

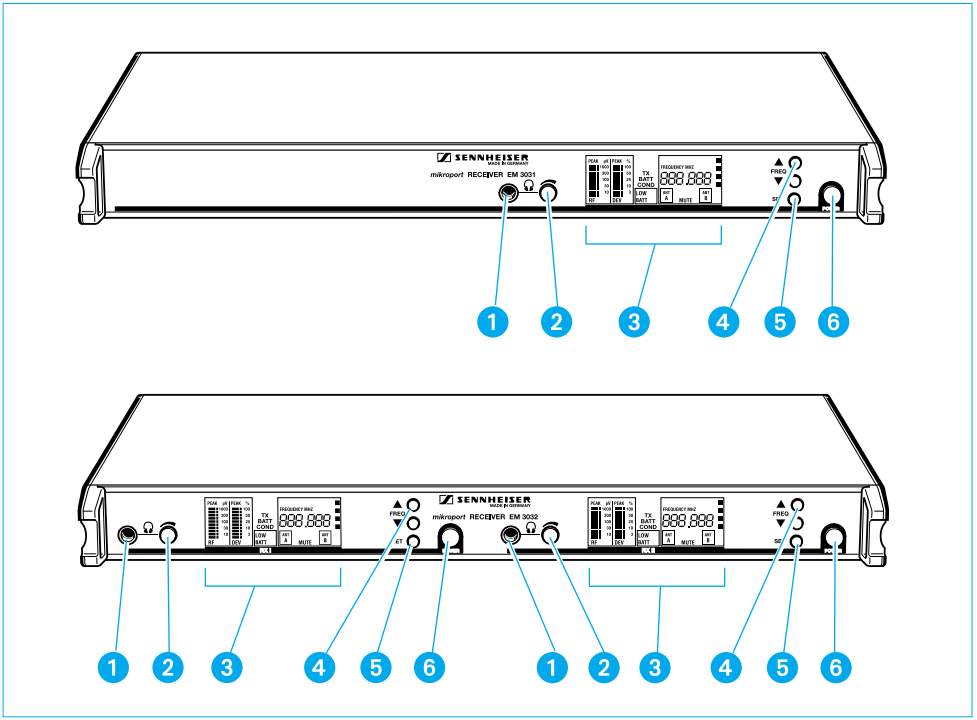
Note

EM 3031-U and EM 3032-U differ in the fact that the EM 3032-U contains two complete true diversity receivers in a single 1 U rack housing. These two receivers are powered by a common mains power supply unit and via a common pair of antennæ (antenna splitter integrated).

This manual is therefore always restricted to the description of just one receiver, the operation of the second receiver in the EM 3032-U is similar.

Special features

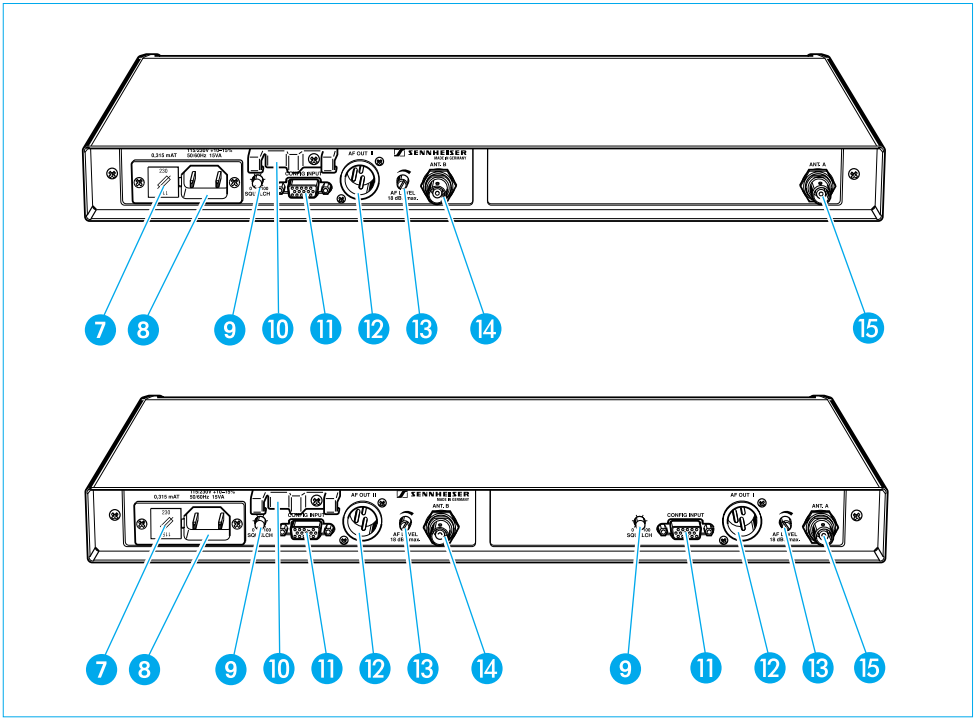
- PLL microprocessor control, programmable
- Sennheiser **HiDyn *plus*®** noise reduction system
- High transmission reliability due to true diversity reception
- Ease of use
- "LOW BATT" display for transmitter battery status
- 19" 1 U housing
- Supply voltage for external antenna boosters



2 Connections and operating elements

1. Headphone socket $^1/_4$ “ (6.3 mm) ø
2. Headphone volume control
3. Multi-function display panel
4. Buttons for selecting the receiving frequency
5. SET/storage button for channel programming

   Changing the receiving frequency:
   - Button 5
   - Buttons 4, ▲ or ▼
   - Button 5 for about 3 seconds
6. ON / OFF switch



7 Fuse holder and mains voltage selection

8 2-pin IEC mains connector

9 Squelch control

10 Straw relief clamp for mains cable

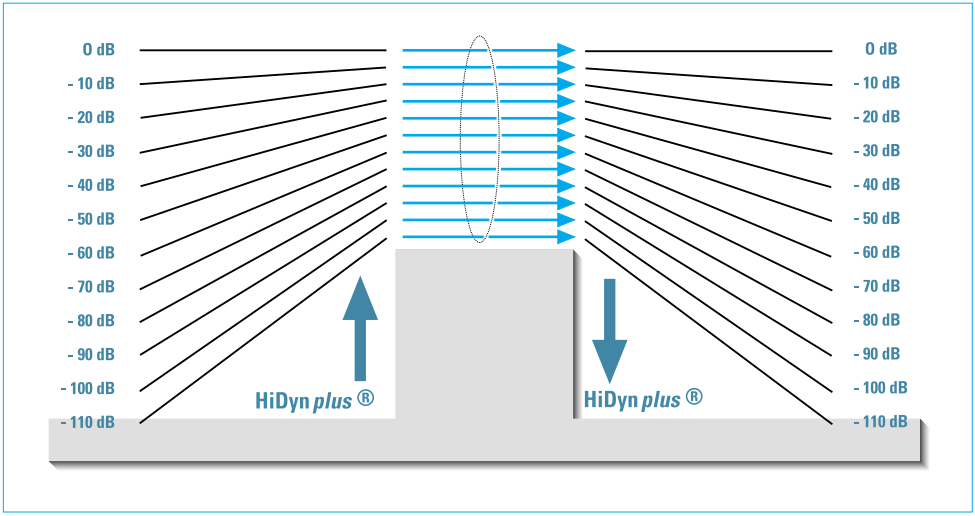
11 Service interface (not used in normal operation)

12 AF output XLR-3, balanced

13 Control for AF output level at the XLR socket 12

14 Antenna input B

15 Antenna input A



3 Noise reduction with **HiDyn *plus*®**

Progress you can hear:

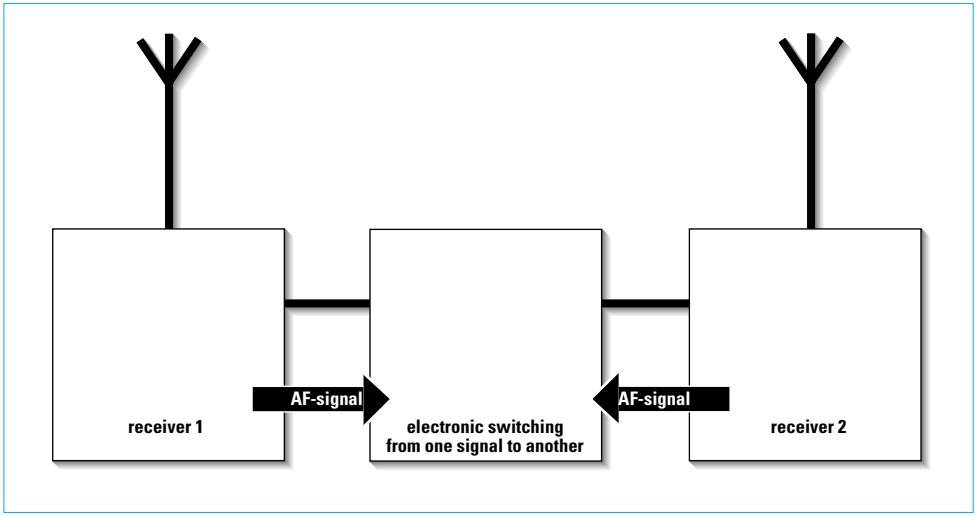
This receiver is equipped with **HiDyn *plus*®**, the Sennheiser noise reduction system. **HiDyn *plus*®** reduces interference from the RF Line. It increases the signal-to-noise ratio in wireless audio transmission to up to 110 dB. The dynamic range of a CD is a maximum of 96 dB (16-bit transducer) and is thus surpassed considerably.

HiDyn *plus*® is a wideband compander system which compresses the AF level on the transmitter side in a ratio of 2:1 (related to dB), and expands it in an exactly the same way on the receiver side. The optimisation of the dynamic range and the supporting effect of the control amplifier in the transmitter effectively reduce modulation problems.

HiDyn *plus*® has been developed for use in high quality radiomicrophone systems.

Note

Only transmitters which are also equipped with **HiDyn *plus*®** can work perfectly in combination with the EM 3031/3032 receiver. If this is not the case, the dynamic range is drastically reduced, the transmission sounds blunt and flat. **HiDyn *plus*®** can not be switched off on the EM 3031/3032 receiver.



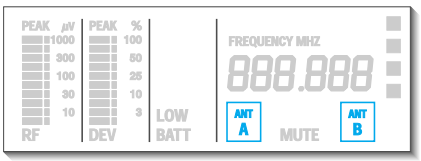
4 Diversity reception

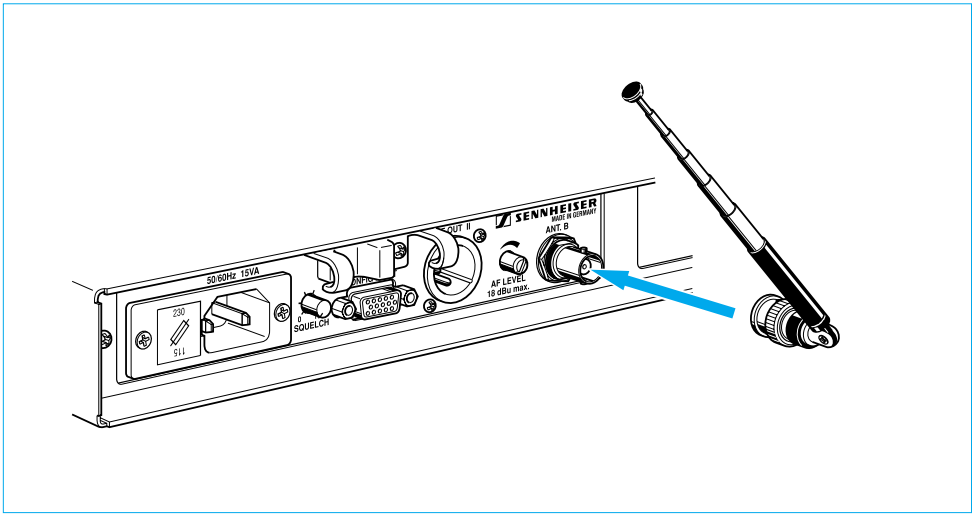
The EM 3031/3032 receiver operates on the “true diversity” principle:

A receiving antenna receives not only the electromagnetic waves which reach it by a direct path, but also the reflections of these waves which are created in the room by walls, windows, ceilings and fittings. When these waves are superimposed, destructive interference occurs, which can also be called “field strength gaps”. Repositioning the receiving antenna can bring a solution, provided the transmitter remains in its original position. With mobile transmitters, however (which all radiomicrophones are), the “field strength gap“ will then occur with a different transmitter position. These “field strength gaps“ can only be eliminated with true diversity receivers.

In true diversity, instead of one antenna and one receiver there are now two antennæ and two receiver sections. The antennæ are spatially separated. By means of a comparison circuit, the receiver section with the strongest RF signal is always switched to the common AF output. The risk of the occurrence of “field strength gaps” in both antennæ at the same time is virtually nonexistant.

The display panel of the receiver always shows whether the diversity channel switched is channel A or channel B.



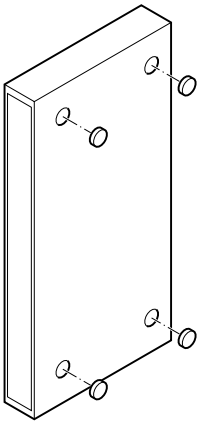


5 Assembly and mounting

Use as a stand-alone receiver

For use as a stand-alone receiver, it is recommended that the supplied telescopic antennæ are used. They can be mounted quickly and easily to the rear of the receiver and are suitable for all applications where – good reception conditions provided – a wireless transmission system is to be used without a large amount of installation work.

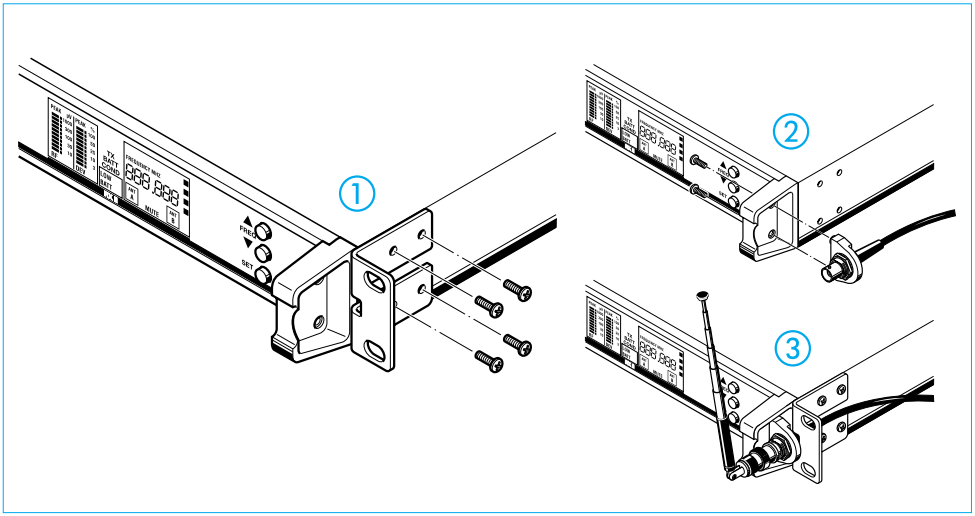
To ensure that the receiver is securely mounted on a surface on which it can not slip, four self-adhesive soft rubber feet are supplied. These feet are stuck into the recesses on the lower side of the receiver.



Ensure that the recesses are clean and free from grease before mounting the feet.

N.B.

Do not use these feet if rack-mounting the receiver.



Mounting the receiver into a rack

With the two rack mount “ears“ supplied, the receiver can be mounted into a 19" rack (1 U). The rack mount “ears“ are screwed to the receiver on the left and right ①.

Note

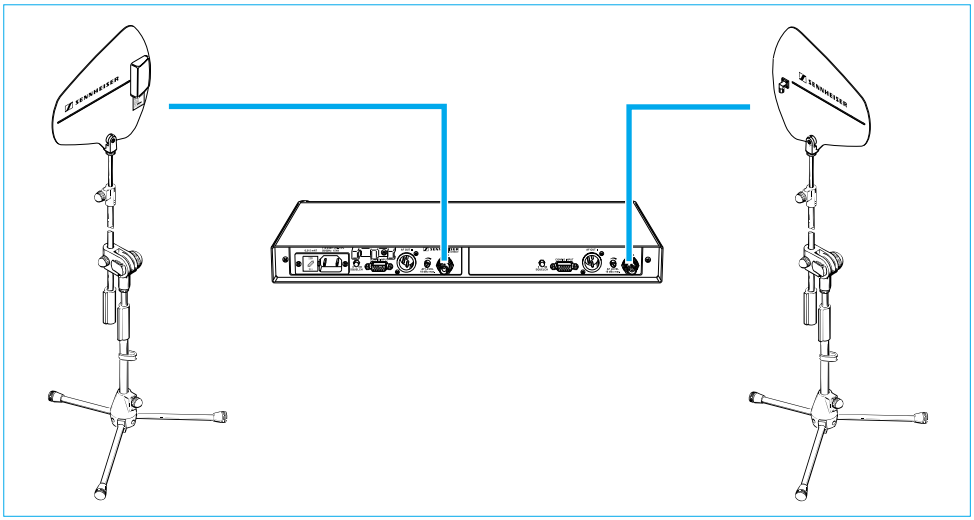
If you wish to connect the antennæ to the front side, you must now pull the cables of the GA 3030-AM antenna mount through the holes on the rack mount “ears“ before mouting the “ears“ ②.

The GA 3030-AM antenna mount (accessory, see chapter 23) allows the antennæ to be connected to the front of the receiver, for example if the rear of the rack is closed.

Mount the antenna holders to the right and left to the handles of the receiver ③. The connection cables, which are firmly fixed to the antenna holders, are connected to the antenna sockets on the rear of the receiver.

Assembly instructions

- Do not place receivers in direct proximity to digitally controlled devices!
- Site the receivers as high as possible so that the receiving antennæ have a “free line of sight” to the transmitter antennæ!



6 Connection and mounting of remote antennæ

If the receiver position is not the best antenna position for optimum reception, you can use remote antennæ. These are available as accessories.

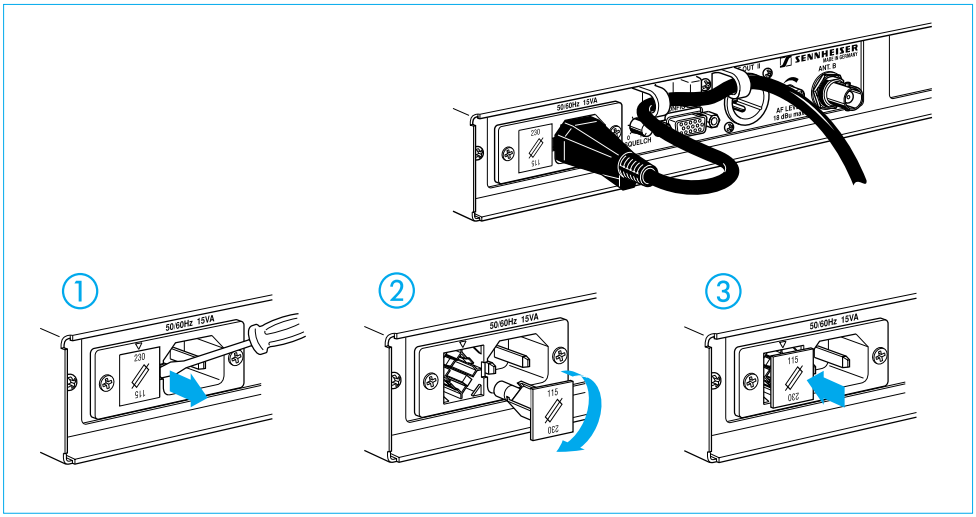
The best reception quality is obtained with the Sennheiser A12 AD-UHF active antenna. Antenna and receiver can be connected with a RG 58 co-axial cable. Ready made up antenna cables from Sennheiser are available as accessories with lengths of 1 m, 5 m and 10 m (see chapter 20)

Attention!

To supply the antenna booster integrated in the A12 AD-UHF active antenna, a direct voltage (which can not be switched off) is output via the antenna sockets. If you use antennæ from other manufacturers instead of the A12 AD-UHF, take into account that these must be installed with direct voltage decoupling, i.e. isolated. The output voltage supply is short circuit-proof, but an active antenna connected to this supply increases the power consumption of the overall device.

Notes on mounting the antennæ (which absolutely must be adhered to)

- Position antennæ in the same room in which the transmission takes place!
- Maintain a minimum distance of 1 metre from metal objects (including walls of reinforced concrete)!
- Maintain a minimum distance of 1 metre between the receiving antennæ!



7 Switching the mains voltage

Before you plug the mains connector into the mains, please check first of all that the receiver is set to the correct mains voltage!

You can switch the mains voltage by removing the fuse holder 7 with the inserted fuse ①, turning it through 180° and inserting it again ②, ③. The rated voltage set can now be seen **at the top** of the fuse holder.

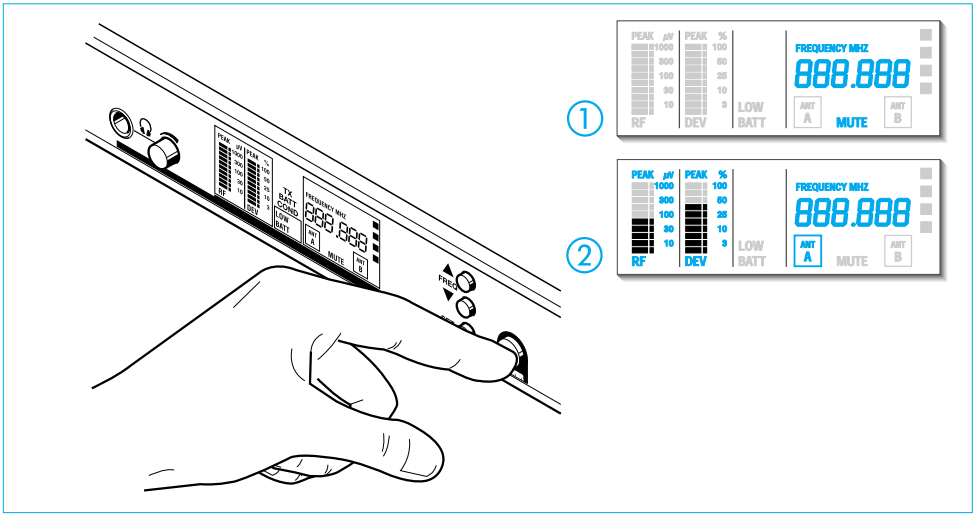
Mains connection

Insert the mains cable supplied into the socket 8 on the receiver and pass the cable through the traction relief 10.

Because of the traction relief, the cable can no longer slip out of socket 8 and interrupt operation.

Note

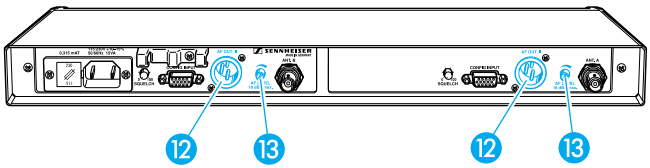
A straw relief clamp is particularly important when the receiver is permanently rack mounted. Inside the rack there are often a large number of cables - a straw relief clamp bracket prevents the cables from pressing each other out.



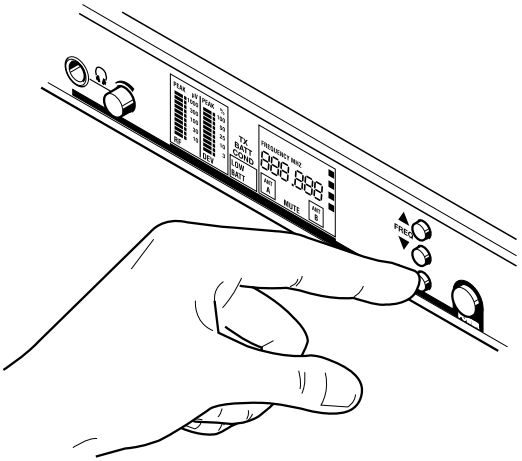
8 Putting the receiver into operation

The receiver is switched on with the ON / OFF switch 6. Display panel 3 is now lit up to show that the receiver is switched on, and the last frequency set is shown (see chapter 10). The display "**MUTE**" (see chapter 13) is lit up ①. If a suitable transmitter is already operating on this frequency, the display "**MUTE**" is initially lit up for about 4 seconds. Then the display changes to "**RF**" and "**DEV**" ② (RF level and modulation, see chapter 13), and the diversity branch in use is displayed (see chapter 4).

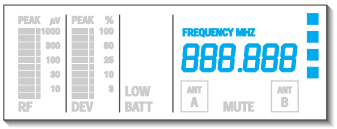
Note
The ON / OFF switch 6 works in the secondary circuit of the integrated mains transformer, and thus only switches the low voltage side. By using a modern magnetic core transformer, the power consumption of a EM 3031/3032 receiver of approx. $^1/_2$ Watt when switched off is extremely low. For larger installations with several receivers, a complete mains disconnection can best be achieved by an additional common ON / OFF switch.



The AF connection is via the socket 12 on the rear. The control 13 controls the AF signal output level.



③



9 Changing the receiving frequency

To change the receiving frequency, please proceed with the following steps:

- Press button 5 ("**SET**"). The text "FREQUENCY MHZ" in display panel 3 begins to flash.
- With buttons 4 (▲/▼) you can now select a different frequency. The display always jumps to the next fixed frequency setting in the program. 8 channels are allocated to each range. The 4 possible ranges are always shown by the display ③ in display panel 3.
- Have you set the frequency correctly? Then press button 5 ("**SET**") again for about 3 seconds. Your entry is confirmed by the fact that the text "FREQUENCY MHZ" ceases to flash. At the same time, "Sto" appears and the other displays in display panel 3 go off briefly.

Only now does the receiver change to the new frequency, any existing RF link to a transmitter on the previous frequency is interrupted.

You can discontinue your entry at any time by briefly pressing button 5 ("**SET**"). The cancellation is briefly confirmed on the display panel 3 with "ESC". The receiver switches back to normal operation and the text "FREQUENCY MHZ" ceases to flash. The frequency to which the receiver was set appears again.

After about 5 seconds, the receiver then automatically returns to normal operation if no entry has been made during this period. Here, too, "ESC" flashes briefly. You must then begin operation over again.

10 Selection and combination of possible receiving frequencies

Each EM 3031 receiver (or each of the two EM 3032 receivers) can be programmed with a maximum of 32 receiving frequencies within the switching bandwidth. These receiving frequencies are divided into 4 groups.

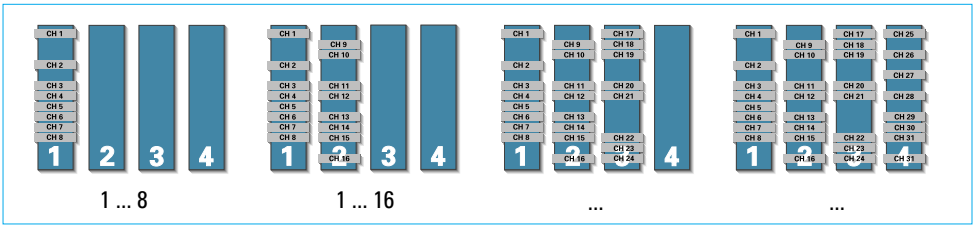
Each group can contain from 0 to 8 receiving frequencies.

Pre-programming and group assignment is carried out by the factory according to your specifications.

Possible specifications for frequency combinations:

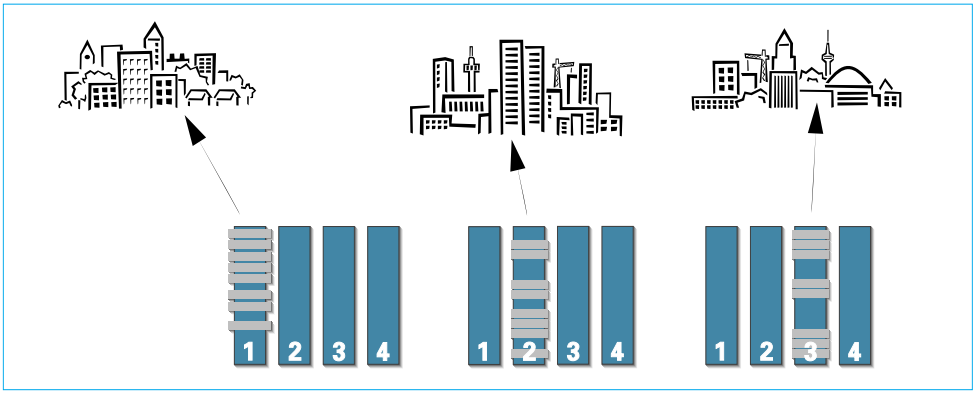
① Use of several receivers to make up a multi-channel system

With this frequency combination, the receiving frequencies are divided into groups such that they can simultaneously be used within one group (or several groups) without causing intermodulation interferences.



② Use of receivers in different places

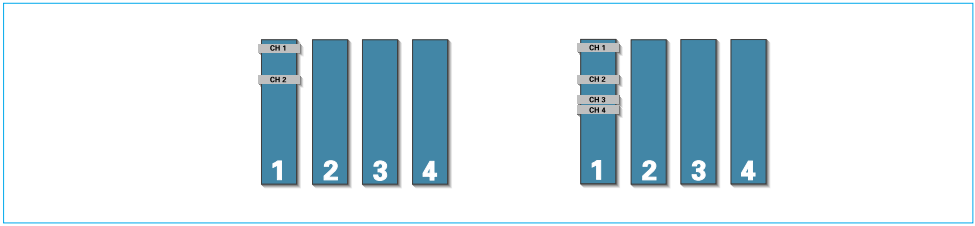
Here, a frequency group is assigned to a TV channel. If one or several receiving frequencies are subject to interference (e.g. due to TV transmitters), please choose a frequency group in a different TV channel.



③ Number of receiving frequencies

For ease of use, or if required by country-specific restrictions on the frequency usage, it is also possible to program less than 32 receiving frequencies.

Your local Sennheiser distributor will be happy to help you in the selection of your receiving frequencies.

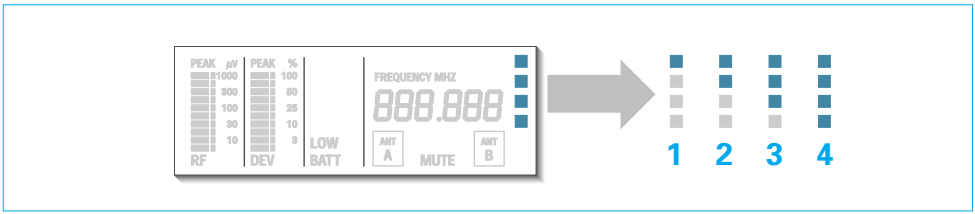


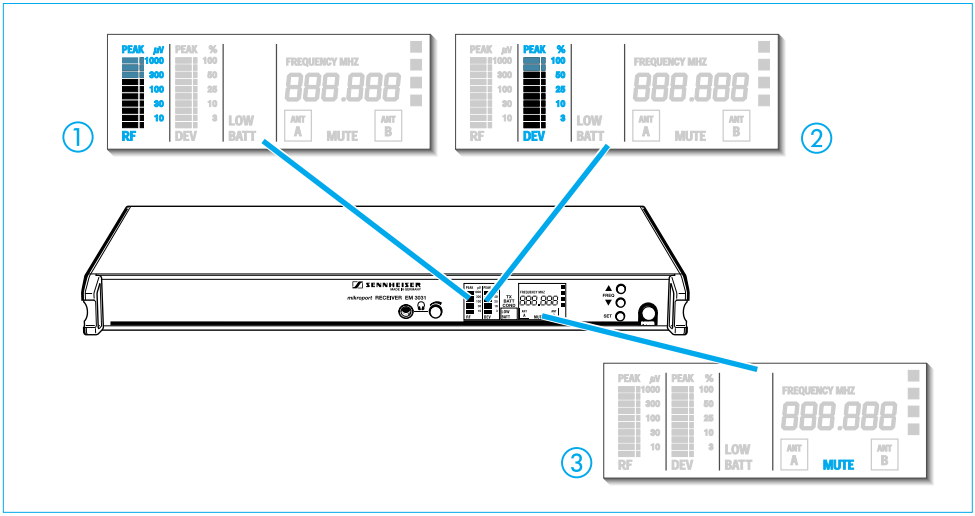
11 Reprogramming the receiving frequencies – no problem!

If you wish – for whatever reason – to change your receiving frequencies, reprogramming, within the limits of the receiver's specifications, can be carried out without any problems by your local Sennheiser service department.

12 Display of frequency groups

In the selection of receiving frequencies, the receiver goes through the four groups in succession. The groups are shown on the display panel in display ③. Each additional illuminated dot represents a further group:





13 Power of the received RF signal

In display panel ③, the power of the received RF signal ① in (µV) and the level control of the AF signal ② – i.e. the modulation of the RF signal (in %) are shown. Both displays have an overmodulation display. If the signal is too high, the text "PEAK" lights up briefly. Short overmodulation is not critical. Where longer overmodulation occurs, the modulation of the corresponding transmitter must be reduced. For the AF signal, "peak hold" is also shown, which means that short peaks remain visible for some time.

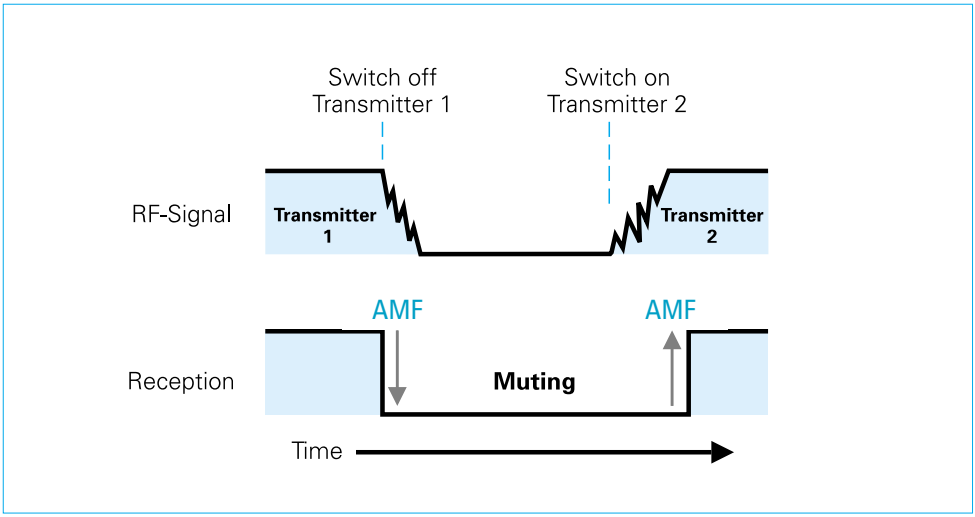
14 Squelch (Muting)

The EM 3031/3032 receiver is equipped with an adjustable squelch control which eliminates annoying noise when the transmitters are switched on and off. It also suppresses sudden noise when a transmitter leaves the reception area and there is no longer sufficient transmitter power received by the receiver.

The squelch is adjusted on the rear of the receiver with control 9 ("**MUTING**"). The adjustment range is between 0 and about 100 µV. When the squelch is active, the text ③ "MUTE" is shown in display panel 3.

AF squelch

The squelch also switches on when the selected radio channel is occupied by a wideband interference signal such as that generated by lighting control systems. This prevents an interfering signal from hindering reception even when the interfering signal has a high RF level. When control 9 ("**MUTING**") is set to position "0", the AF squelch is also switched off.



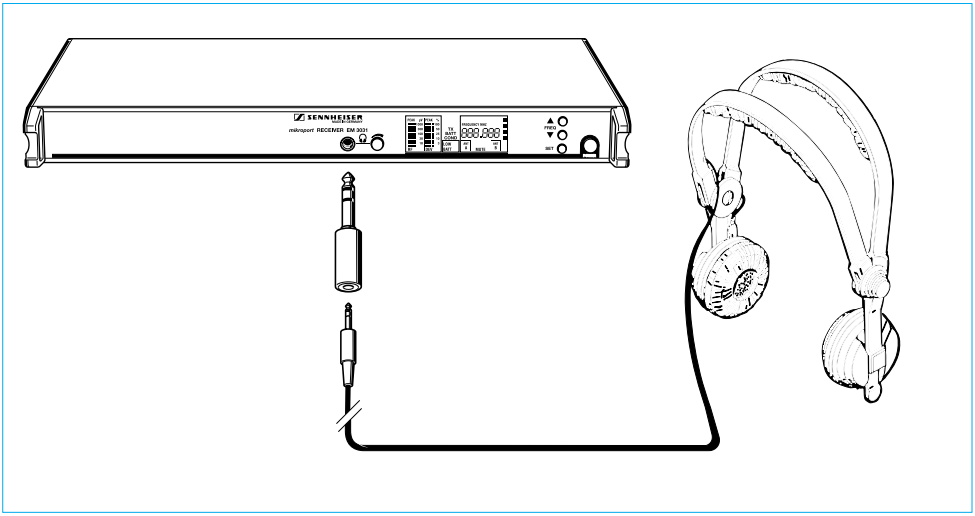
15 Advanced muting function

This receiver also features AMF (**A**dvanced **M**uting **F**unction). This special electronic feature comes into effect when an RF signal drops by about 50 dB in a short time. The reception is then muted for 3 seconds. AMF thus suppresses the annoying switch-off click when a transmitter is switched off. Because of the delay in switching on again, the PLL circuit of the transmitter has enough time to adjust itself back to the corresponding transmission frequency.

Example

One possible area of use for AMF is the inaudible change of a hand-held transmitter. If the battery of the first transmitter has run down (display "LOW BATT" on the receiver), a second transmitter is prepared on the same frequency: insert battery, select transmission channel. Then the first transmitter is switched off, AMF switches to mute and the second transmitter is immediately switched on. The PLL of transmitter 2 stabilises itself, AMF switches on again. The whole procedure takes place inaudibly in the background while AMF is switched to mute. Without AMF, the switching off, switching on and stabilising of the transmission frequency would have been audible in the form of possible crackles and whistling noises.

AMF can be switched off. As it is coupled with the setting of the normal squelch, its function is cancelled if control 9 ("**MUTING**") is turned to position "0".



16 Monitoring the sound signal, headphone connection

Socket 1 on the EM 3031/3032 receiver can be used to monitor the sound signal received with headphones. The headphone volume is adjusted with control 2.

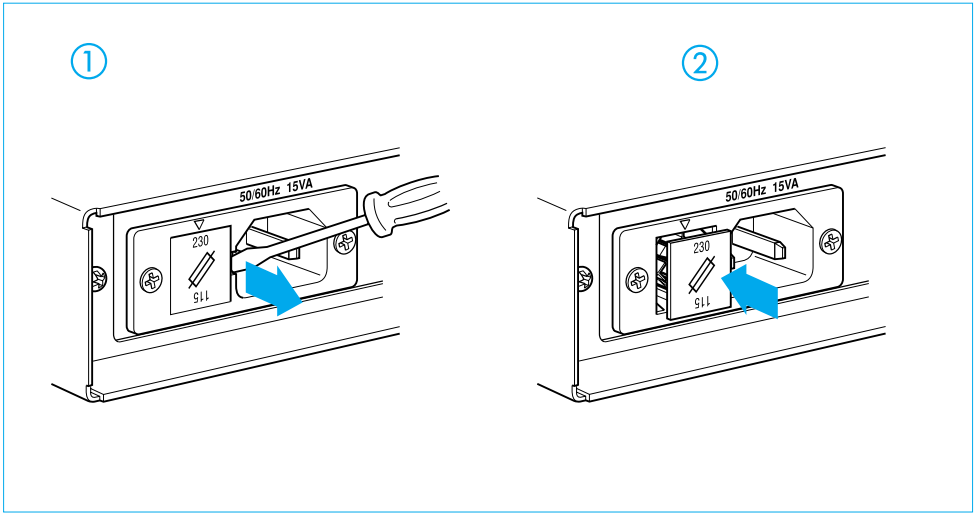
Please use headphones with a $^1/_4$ “ (6.3 mm) ø stereo jack plug. The sound signal itself is mono. The Sennheiser HD 25 headphone is especially usefull for this purpose.

In order to judge the quality of the received sound signal even under unfavourable conditions (low AF level in the transmitter) and with high ambient noise (e.g. on the stage), the sound signal at socket 1 can be monitored at an amplification of up to 30 dB compared with the LINE output. For strong sound signals, however, this can distort the sound if control 2 is turned to a high level. In this case, turn control 2 down until the distortion disappears. If the distortion remains, the transmitter itself is overmodulated.

Volume up? – No!

First of all, the volume control 2 should always be adjusted to the lowest volume (by turning it anti-clockwise as far as possible). Then turn up the volume control 2 gradually until you have reached the desired volume.

When people use headphones, they tend to choose a higher volume than with loudspeakers. Listening at high volume levels for long periods can lead to permanent hearing defects. Please protect your hearing, and as far as possible, check the sound signal only briefly with the headphone.

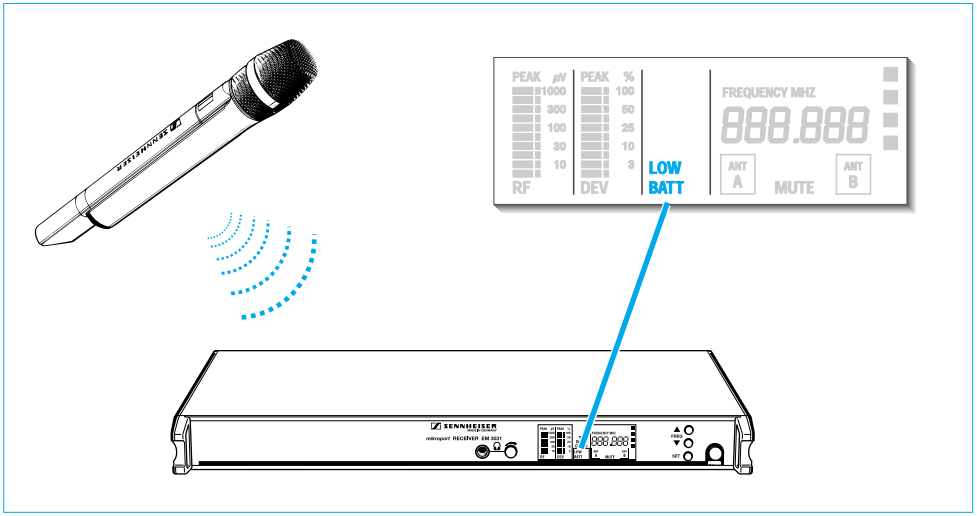


17 Replacing a fuse

Disconnect the receiver completely from the mains! To do so, pull out the mains connector 8 on the receiver. You can then remove the fuse holder 7 with the inserted fuse. Replace the fuse by a new fuse with the same rating and switch on the receiver again. Make sure that you have inserted the fuse holder in such a way that the receiver is operated with the correct mains power!

A faulty fuse should always be regarded as a warning. In most cases, the cause is harmless – a short voltage surge or some similar cause has triggered the protective mechanism. When the fuse has been replaced, the receiver works again.

If the replacement fuse also blows, please consult a specialist who can discover the cause. We recommend you to contact your Sennheiser distributor or to send the receiver, with a precise description of the trouble, to a Sennheiser service departement in your area. You can find the address of your nearest service departement in the enclosed Service card or on the Internet under “http://www.sennheiser.com”.



18 Sennheiser transmitters report their battery status

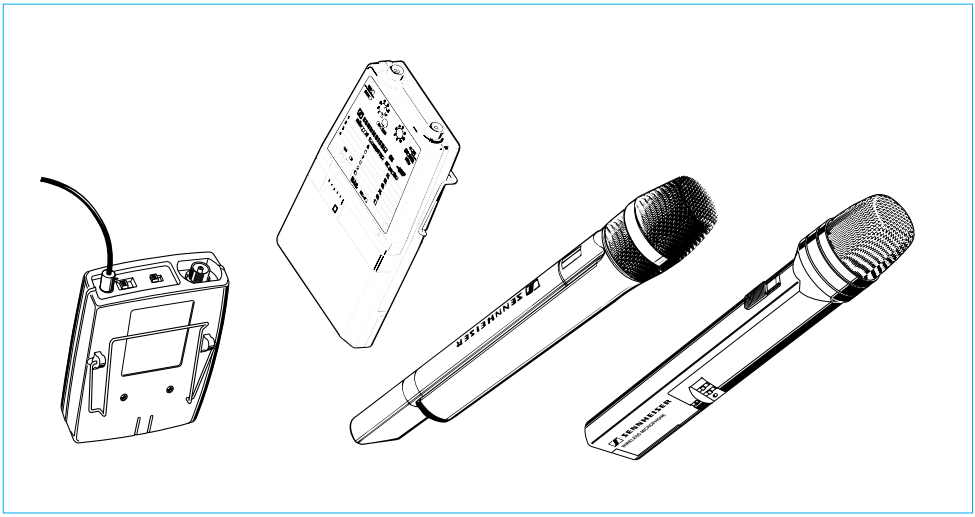
Sennheiser supplies hand-held and pocket transmitters which provide information on the available transmitter battery status to the receiver. This information can be evaluated with the EM 3031 / EM 3032 receivers.

When the battery capacity is so low that only a transmission time of about 20 to 30 minutes remains, the text "LOW BATT" flashes on the display panel 3.

You should now immediately replace the transmitter battery. The AMF (**A**dvanced **M**uting **F**unction) in the EM 3031 / EM 3032 receiver helps you, as far as possible, to maintain the transmission without noise (see chapter 15).

Notes

- The "LOW BATT" display is reset by the mute function. Whenever the squelch is activated in the receiver, the "LOW BATT" display goes off and the evaluation of the feedback from the transmitter starts over again.
- Under favourable reception conditions, the evaluation of the battery information from the transmitter lasts about 10 – 20 seconds. However, it can be significantly longer if reception is subject to interference from time to time. This time is then also needed by the display in display panel 3 in order to update the information shown.



19 Suitable Sennheiser transmitters

For the optimum use of the excellent reception qualities of the EM 3031 / EM 3032 receivers, Sennheiser offers hand-held and pocket transmitters in a variety of configurations:

Pocket transmitters:	SK 1063-U	(without display of battery condition)
	BF 1083-U	(without display of battery condition)
	SK 50-U	(with display of battery condition)
	SK 250-U	(with display of battery condition)
Hand-held transmitters:	SKM 1072-U	(without display of battery condition)
	SKM 3072-U	(with display of battery condition)*
	SKM 5000-U	(with display of battery condition)

Information on the many possible combinations of Sennheiser products and their use in multi-channel systems can be found in the planning brochure “Practical Applications in RF Technology” which your Sennheiser distributor has in stock or will be pleased to order for you from Sennheiser.

Up to date information on Sennheiser products can also be found on the Internet under “http://www.sennheiser.com”.

Sennheiser products are exclusively distributed through authorised Sennheiser distributors. We regret that deliveries direct to private customers are not possible.

* available from approx. 4/97

20 Error messages

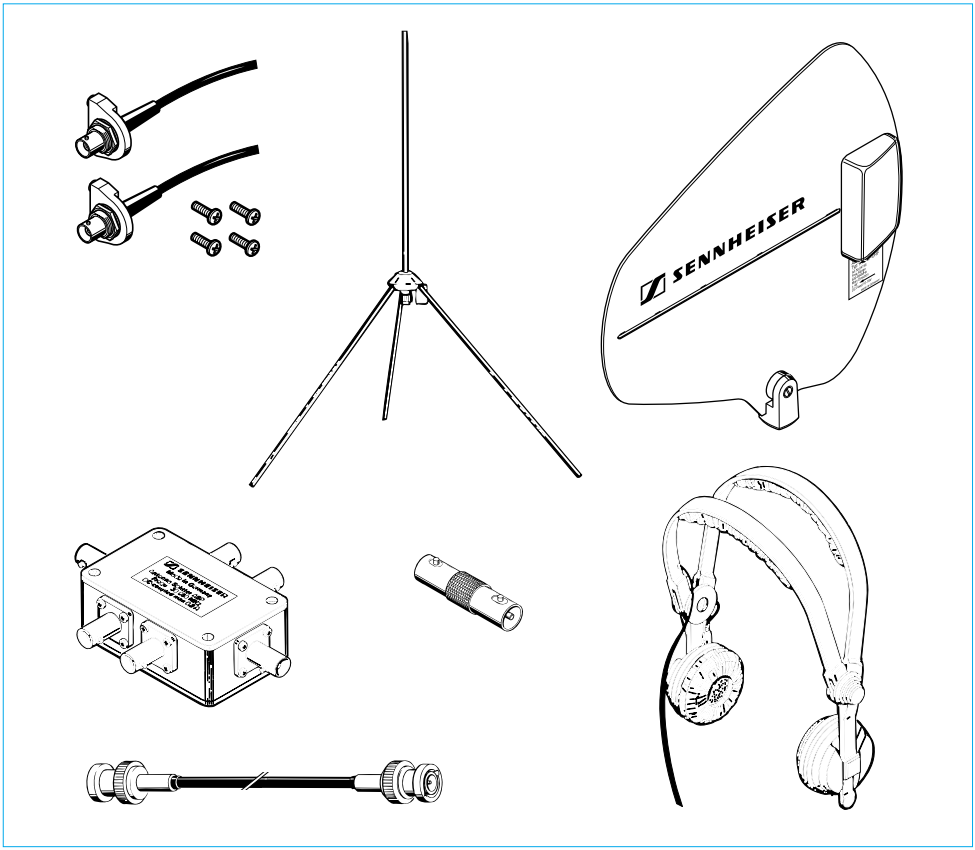
The display panel of the receiver is also used by the integrated microprocessor to display error messages for service purposes. If you see error messages such as ERR 1, ERR 2, ERR 3 or ERR 4, there is a fault in the receiver unit which can only be corrected by your local Sennheiser service departement.

21 Error checklist

Error	Possible cause
Receiver does not work; operating display dark	• Fuse defective
Receiver does not work; operating display lit up	• Frequency of transmitter does not agree with receiving frequency • Switching threshold adjustment for mute function too high
Sound distorted	• AF output signal adjusted too high. Input of the connected mixing console or amplifier is overmodulated • Transmission microphone overmodulated (see corresponding section in the operating manual of the transmitter)
Sound overlaid with background noise	• Transmitter not sensitive enough; where appropriate, switch transmitter sensitivity from ”low” to ”high”

22 Safety instructions

- Never open electronic devices! This must only be done by authorised personnel and is all the more important for current-carrying units. If devices are opened by customers in breach of this instruction, the warranty becomes null and void.
- Always disconnect the unit from the main by removing the plug when you wish to change connections or move the device to a different place.
- Keep the system away from central heating radiators and electric heaters. Never expose it to direct sunlight.
- Use the system in dry rooms only.
- Use a damp cloth for cleaning the device. Do not use any cleansing agents or solvents.



23 Recommended accessories

•	Antenna mount	GA 3030-AM	Cat. no. 04368
•	Active antenna	A 12 UHF	Cat. no. 04156
•	Ground plane antenna	GZA 1036-9	Cat. no. 02332
•	Co-axial cable, 1 m	GZL 1019 A1	Cat. no. 02324
•	Co-axial cable, 5 m	GZL 1019 A5	Cat. no. 02325
•	Co-axial cable, 10 m	GZL 1019 A10	Cat. no. 02326
•	BNC coupler	GZV 1019A	Cat. no. 02368
•	Active antenna splitter acc. to customer specifications	AS-X	Cat. no. 03273
•	Monitoring headphone	HD 25	Cat. no. 02976

RF characteristics

Frequency range		430–960 MHz
Receiver frequencies		max. 32 in 4 groups, pre-programmedto customer specifications
Switching bandwidth		24 MHz
Frequency stability		± 10 ppm (-10°C to +55°C)
Sensitivity (with **HiDyn *plus*®**)		typ: 5 µV for 90 dBAeff SNR
Squelch treshold		0 to 100 µV, adjustable
Image rejection		≥ 50 dB, typ. 65 dB
Adjacent channel rejection		≥ 75 dB
Intermodulation attenuation	typ. 66 dB	(400 kHz/800 kHz)
Free field interference radiation	30 – 2000 MHz	> -57 dBm (2nW)
Antenna input		2 BNC sockets
Antenna input impedance		50 Ω

AF characteristics

Modulation		wideband FM
Compander system		Sennheiser **HiDyn *plus*®**
De-emphasis		50 µs
Nominal/peak deviation		±40 kHz/±56 kHz
AF frequency response		45–20,000 Hz
AF outputs	LINE	3-pin XLR, transformer balanced
	MONITOR	$^1/_4$“ (6.3 mm) ø jack plug (mono signal on stereo socket Signal to L- and R-ring, sleeve earthed)
AF output voltage at peak deviation		LINE: 0–5.6 V adjustable, ≥ 2 kΩ MONITOR: 0–2.8 V adjustable, ≥ 600 Ω
Amplification on monitor output		30 dB
Source impedance of AF output		≤ 50 Ω (LINE at max. level)
Signal-to-noise ratio		120 dBA eff
at 1 mV_{RF} and peak deviation		116 dB external eff
		106 dB CCIR peak
THD at 1 kHz and nominal deviation		≤ 0.5%, typ. 0.25%

Overall device

Temperature range	-10°C to +55°C
Power supply	115/230 V AC +10%/-15%
Power consumption EM 3031 / 3032	max 10 VA / max 15 VA
Dimensions (without rack mount “ears”)	436 x 215 x 43 mm (19", 1 U)
Weight approx EM 3031 / 3032	3300 g / 4000 g

Änderungen vorbehalten
Subject to alterations
Sous réserve de modification
Con riserva di modifiche
Reservado el derecho a introducir modificaciones
Wijzigingen voorbehouden

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